SmartState

SC Centers of Economic Excellence

RESEARCH STARS

RESEARCH • INNOVATION • INVESTMENT

South Carolina is building an economy based on innovation.

SmartState
SC Centers of Economic Excellence

The state's visionary SmartState Program is leading the way.

The SmartState Program was created by the South Carolina legislature in 2002 and is enabling the state to recruit top scientists and engineers from across the globe. These Research Stars lead the SC Centers of Economic Excellence, world-class R&D programs within South Carolina's three research universities (Clemson University, the Medical University of South Carolina, and the University of South Carolina).

The scientists and engineers recruited through the SmartState Program are working in a variety of critical fields such as automotive engineering, nanotechnology, advanced materials, and biomedicine. Moreover, their research has high potential for commercialization, meaning it can be converted into products, services, and jobs to sustain a competitive, winning economy in South Carolina.

With the leadership of these internationally acclaimed Research Stars, the SmartState Program has attracted more than $1 billion into South Carolina's economy ($400 million received and $600 million in additional commitments) and is responsible for the creation of nearly 5,000 new jobs. ›

Dr. Robert Adams

Endowed Chair in Stroke
at the Medical University of South Carolina

Stroke Center of Economic Excellence

- Specializes in clinical neurology, with a focus on stroke prevention and care.
- Working to better prepare hospitals to provide comprehensive stroke treatment.
- Established the REACH MUSC Program, which connects MUSC neuroscience specialists with partner sites via the Internet to provide round-the-clock stroke care.
- Helped develop the company REACH Call, Inc., which provides system equipment, software, and decision support for urgent specialist consultations via the Internet.

Dr. Gary Aston-Jones

William H. Murray Endowed Chair in Neuropathology at the Medical University of South Carolina

Neuroscience Center of Economic Excellence

- Specializes in brain mechanisms of motivation and cognitive processes, with emphasis on attention deficits in mental disorders such as Attention Deficit Disorder (ADD) and autism.
- Research helped lead to a new drug treatment for ADD.
- Research on the brain's locus coeruleus spurred an article on the causes of autism by the director of the Simons Foundation Autism Research Initiative.
- Work has applications for better determination of the specific processes involved in learning, dementia, addiction, and depression.

Dr. Brian Benicewicz

USC Nanocenter Chair of Material Science and Engineering at the University of South Carolina

Polymer Nanocomposites Center of Economic Excellence

- Specializes in high-temperature fuel cell membranes, polymer synthesis, conducting polymers, and liquid crystalline polymers and thermosets.
- Leading South Carolina's plastics industry to develop new products and improve existing ones.
- Research funding includes grants from the National Science Foundation, the US Department of Energy, and various private industry entities.
- Work in high-temperature fuel cell membranes resulted in a research contract with BASF.

Dr. Charles Bennett

Endowed Chair in Medication Safety and Efficacy at the University of South Carolina

Medication Safety and Efficacy Center of Economic Excellence

- Hematologist and oncologist with research focus on preventing adverse drug events and improving drug safety.
- Seeking ways to make drug information more consumer-friendly and creating new training tools for health care providers.
- Founded RADAR (Research on Adverse Drug events And Reports), an internationally regarded organization that investigates and disseminates information about adverse drug and device reactions. RADAR has identified potentially fatal and previously unreported side effects associated with 43 drugs.

Dr. Marc Chimowitz

Countess Alicia Paolozzi Endowed Chair at the Medical University of South Carolina

Stroke Center of Economic Excellence

- Researches treatments to prevent stroke caused by narrowing of brain arteries.
- Leads a $28.5 million clinical trial funded by the National Institutes of Health. The trial involves patients at more than 50 sites across the country and studies the value of using stents to prevent strokes in patients whose brain arteries have hardened and narrowed due to plaque buildup (atherosclerotic stenosis).

Dr. Louis Guillette

Endowed Chair in Marine Genomics
at the Medical University of South Carolina

Marine Genomics Center of Economic Excellence

- Toxicology expert with a focus on how environmental factors can lead to birth defects in wildlife and humans.
- Research could lead to the development of new testing procedures that prevent or treat health problems caused by environmental factors.
- Engaged in a project with NASA to examine potential health effects of contaminants.
- Conducting research with MUSC's Department of Obstetrics and Gynecology and Department of Pediatrics to study developmental health of babies.

Dr. Joseph Helpern

Endowed Chair in Brain Imaging at the Medical University of South Carolina

Brain Imaging Center of Economic Excellence

- Research focuses on using Magnetic Resonance Imaging (MRI) to investigate neurodegenerative diseases such as Alzheimer's, ADHD, and stroke.
- Participated in the Baylor College of Medicine group of scientists who, in 1979, built the largest and most powerful MRI system to date. Later participated in the 1990 effort to build the first version of the current state-of-the-art 3 Tesla MRI system.
- Holds four patents related to imaging techniques; Fellow of the International Society for Magnetic Resonance in Medicine.

Dr. Todd H. Hubing

Michelin Endowed Chair in Vehicle Electronic Systems Integration at Clemson University

Electronic Systems Integration Center of Economic Excellence

- Research at the Clemson University International Center for Automotive Research (CU-ICAR) focuses on ways to integrate vehicle electronic systems to significantly improve vehicular safety, performance, and reliability.
- Developing more efficient methods for distributing electric power in automobiles to allow hybrid and electric-powered cars of the future to be lighter, more powerful, and more energy-efficient.
- Fellow of the Applied Computational Electromagnetics Society and the Institute of Electrical and Electronics Engineers.

Dr. Simon Hudson

Endowed Chair in Hotel, Restaurant, and Tourism Management at the University of South Carolina

Tourism and Economic Development Center of Economic Excellence

- An internationally recognized tourism expert who has written books on golf tourism, the international ski industry, sports and adventure tourism, and tourism marketing.
- Research focuses on tourism as a driver of economic development.
- Working to create a one-stop resource of advanced information and intelligence for tourism industry stakeholders and improve South Carolina's competitiveness as a tourism destination.

Dr. Stephen Kresovich

Endowed Chair in Marine Genomics
at the University of South Carolina

Marine Genomics Center of Economic Excellence

- Fellow of the American Association for the Advancement of Science and the Crop Science Society of America.
- Internationally recognized for his work in conservation genetics and improvement of crop plants including sorghum, maize, and sugar cane.
- Research focuses on characterizing and exploiting genetic diversity from unique and important organisms of South Carolina, including terrestrial, aquatic, and marine animals, microbes, and plants (including those used for agriculture, horticulture, forestry, and pharmaceutical/industrial purposes).

Dr. Thomas P. Kurfess

BMW Chair in Manufacturing at Clemson University

Automotive Manufacturing Center of Economic Excellence

- Fellow of the American Association for the Advancement of Science, the Society of Manufacturing Engineers, and the American Society of Mechanical Engineers.
- Research at the Clemson University International Center for Automotive Research (CU-ICAR) focuses on precision systems, controls, automation, and robotics.
- Results of his work are being used in a variety of manufacturing environments, helping US companies compete in the global market.
- Preparing the next generation of engineers to work in the complex systems and global environment of today's automotive industry.

Dr. Jochen Lauterbach

CoEE Chair in Strategic Approaches to the Generation of Electricity at the University of South Carolina

Strategic Approaches to the Generation of Electricity Center of Economic Excellence

- Focused on improving environmental control technologies for coal power plants, including improving mercury and gas emission controls.
- Developing new materials and processes to capture and store, or find a use for, carbon emissions.
- Research has been funded by the National Science Foundation and the US Department of Energy, as well as industries such as Ford Motor Company, Union Carbide, Mitsubishi Chemicals, Shell, and Toyota.

Dr. John J. Lemasters

GlaxoSmithKline Distinguished Endowed Chair at the Medical University of South Carolina

Cancer Drug Discovery Center of Economic Excellence

- Pioneer of techniques that allow scientists to see what happens inside an individual cell during reoxygenation—the restoration of oxygen to an organ following oxygen deprivation, which sometimes occurs following a heart attack or stroke.
- Pioneer in a cellular microscopy that allows scientists to view slices of an individual cell, much like CAT or MRI scans complement the more traditional X-ray by allowing doctors to view the body in layers.
- Other applications for research include understanding the mechanisms through which the liver is injured by chronic alcohol use and donated organs are damaged while being held for transplant surgery.

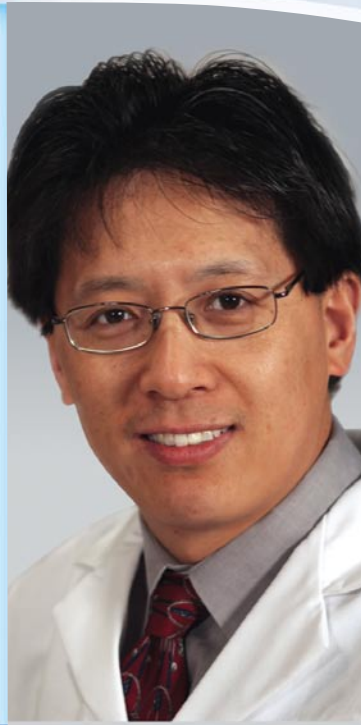
Dr. Sue Levkoff

Endowed Chair in Community and Social Support — SmartHOME® at the University of South Carolina

SeniorSMART® Center of Economic Excellence

- Research addresses the challenges of a growing population of older Americans by helping older adults remain healthy and independent.
- Work focuses on developing technologies that will enable older adults to remain at home in the community with adequate supports, both for them and their caregivers.
- Recipient of sizable federal grants from the National Institute on Aging and the Fogarty International Center of the National Institutes of Health.
- Her company, Environment and Health, is developing several health information technology products.

Dr. Zihai Li



Endowed Chair in Cancer Stem Cell Biology at the Medical University of South Carolina

Cancer Stem Cell Biology Center of Economic Excellence

- An expert in the field of cancer immunology – finding ways to help the body's immune system recognize and fight cancer cells and control tumor growth.
- Research may lead to cell-based therapies and new drugs to help the immune system fight cancer.
- Captured international attention when his study was published in the October 2009 issue of *Stem Cells*; the study revealed the potential for human stem cells to be used in the creation of a vaccine to protect against colon cancer and to be used for other types of cancer as well.
- Holds a US patent and four investigational new drug applications approved by the US Food and Drug Administration.

Dr. Scott J. Mason

Fluor Endowed Chair in Supply Chain Optimization and Logistics at Clemson University

Supply Chain Optimization and Logistics Center of Economic Excellence

- An expert in large-scale supply systems modeling, optimization, and algorithms with emphasis in capital project supply chains.
- Also specializes in scheduling and planning in manufacturing, public education, and service industries with an emphasis in semiconductor manufacturing.
- Research is strengthening Clemson's established supply chain programs.

Dr. Martin Morad

BlueCross BlueShield of South Carolina Foundation Endowed Chair in Cardiovascular Health at the University of South Carolina

Regenerative Medicine Center of Economic Excellence

- An internationally recognized researcher with particular expertise in the field of cardiac electrophysiology and calcium signaling.
- Seeks to discover what causes mechanisms in cardiac muscle that control the heartbeat to stop working properly, which can result in congestive heart failure; understanding this process could lead to new therapeutic approaches to treat congestive heart failure and other conditions.
- Research could lead to the world's first tissue-derived human heart pacemaker.

Dr. Jay Moskowitz

Endowed Chair in Clinical and Translational Research at the University of South Carolina

Health Care Quality Center of Economic Excellence

- Recognized as a leader in biomedical research and research policy administration with more than 40 years of health policy experience.
- Working to bring together health care systems, providers, and researchers to enhance patient care through clinical trials and interchange of electronic patient records.
- Work could increase the efficiency and profitability of South Carolina's health care providers and help attract companies within the medical information sector to the state.
- Served as the principal deputy director at the National Institutes of Health; currently also serves as president of Health Sciences South Carolina.

Dr. Jihad Obeid

Endowed Chair in Biomedical Informatics at the Medical University of South Carolina

Clinical Effectiveness and Patient Safety Center of Economic Excellence

- Expert in research databases and web-based clinical research systems who is known internationally for developing innovative software to manage complex datasets in clinical settings.
- Work with medical informatics systems is making it easier for researchers to collect and analyze clinical trials data, which will enable researchers to conduct more rigorous studies and more easily compare the effectiveness of different treatments for a given disease, ultimately allowing treatments to move from the lab to the patient faster and more efficiently.
- Collaborates with information technology professionals throughout South Carolina to develop software and infrastructure that helps researchers share data and work together across hospitals and universities.

Dr. Kenneth Reifsnider

Endowed Chair in Solid Oxide Fuel Cells at the University of South Carolina

Solid Oxide Fuel Cells Center of Economic Excellence

- Member of the prestigious National Academy of Engineering; also a member of the Air Force Science Advisory Board.
- Research focuses on fuel cell science and engineering; applications for his work include large-scale power distribution for municipalities, rural areas, and industries, as well as heat and power for homes and electronic devices.
- Leads a $12.5 million DOE Energy Frontiers Research Center grant, a partnership between and among four national laboratories and eight universities.

Dr. Igor Roninson

Endowed Chair in Translational Cancer Therapeutics at the University of South Carolina

- Internationally recognized for his many research accomplishments in the cancer field including his study of multidrug resistance in cancer and chemotherapy-induced senescence in tumor cells.
- Holds 39 US patents.
- Winner of the American Association for Cancer Research (AACR) Award for Meritorious Achievement in Cancer Research and the Life Extension Prize from the Regenerative Medicine Secretariat.

Dr. Chris Rorden

Endowed Chair in Neuroimaging
at the University of South Carolina
Brain Imaging Center of Economic Excellence

- Work focuses on understanding the problems of language and perception following stroke injury.
- Research employs state-of-the-art methods, functional MRI, brain stimulation, scalp electrical recording, and sophisticated behavioral measures to understand brain function.
- Research supported by the National Institutes of Health.

Dr. Iain Sanderson

Endowed Chair in Medical Informatics at the Medical University of South Carolina

Health Care Quality Center of Economic Excellence

- Leads initiatives in medical informatics across the state's four largest health care delivery systems and three research universities.
- Goal of his work is improving the quality of health care in South Carolina by creating secure databases for medical records that make it easier for multiple health care systems to share vital information that is relevant for clinical trials and research.

Dr. John J. Schaefer

Lewis Blackman Endowed Chair for Patient Simulation and Research at the Medical University of South Carolina

Clinical Effectiveness and Patient Safety Center of Economic Excellence

- An international expert in health care simulation who is working to reduce patient injury and improve medical outcomes.
- Developing training, equipment, and software programs that are helping make South Carolina a leader in the medical simulation field.
- Co-founder of SimTunes, a simulation education company, which has sublicensed its technology to global manufacturer Laerdal Medical.
- Developed a statewide network of medical simulation centers in South Carolina, which are enabling health care providers to practice their skills in a controlled, risk-free environment, rather than in an actual patient setting.

Dr. Souvik Sen

Endowed Chair in Stroke Neurology at the University of South Carolina

Stroke Center of Economic Excellence

- Research focuses on understanding stroke risk factors and developing new approaches for treatment and prevention, especially for acute stroke treatment (treating strokes within hours of onset) and cardio-embolic strokes (strokes caused by blood clots that develop in the heart and travel to the brain).
- Establishing a Joint Commission-certified stroke center in South Carolina. The Joint Commission is a highly respected accrediting body whose certifications recognize the top stroke centers in the nation.
- Before his appointment at USC, was the founding director of the nationally recognized University of North Carolina Stroke Center.

Dr. George R. Simon

The Burtschy Family Distinguished Endowed Chair in Lung Cancer Research at the Medical University of South Carolina

Tobacco-Related Malignancy Center of Economic Excellence

- An expert in thoracic malignancies, with an emphasis on lung cancer and mesothelioma.
- Led the first clinical trial to prescribe individualized treatments for patients with advanced-stage lung cancer based on the expression of certain genes found in the patient's tumor.
- Recipient of the Young Investigator Pharmacogenomic Award and the Thorkildson Fellowship.

Dr. Charles D. Smith

Charles and Carol Cooper Chair in Pharmacy at the Medical University of South Carolina

Cancer Drug Discovery Center of Economic Excellence

- Working to design new drugs to fight cancer by unlocking molecular mechanisms important for tumor growth.
- Research could enable the development of new drugs to fight a variety of inflammatory diseases, including arthritis, Crohn's Disease, and diabetic retinopathy.
- Under Smith's leadership, MUSC's Center for Drug Discovery has investigated additional conditions including pain, liver injury, and stroke.
- Has identified a new target in cancer cells in collaboration with other Center researchers.
- Holds nine patents in his field; research funded by the National Institutes of Health.

Dr. Rita Snyder

Endowed Chair in Health Informatics Quality and Safety Evaluation at the University of South Carolina

Clinical Effectiveness and Patient Safety Center of Economic Excellence

- Work emphasizes the use of health information technology to improve health care quality and safety.
- Focusing on the integration and use of health IT in South Carolina's statewide network of medical simulation centers, which feature computerized mannequins that realistically simulate dozens of human functions to provide a low-risk, high-quality learning experience for future clinicians.

Dr. Richard Swaja

Endowed Chair in Regenerative Medicine at the Medical University of South Carolina

Regenerative Medicine Center of Economic Excellence

- Work focuses on applying tissue engineering principles to restore the structure and function of damaged or diseased tissues and organs.
- Goal is to advance current medical practice by enabling in vivo regeneration of damaged tissues to return them to full functionality and in vitro production of tissues and organs for transplantation.
- Research focuses on biofabrication of organs using autologous stem cells and industrial-scale production methods.
- Working to build South Carolina's bioengineering capabilities by developing statewide research, education, and technology transfer programs that bridge disciplines, distances, and organizations to improve quality of life and support the regional economy.

Dr. Kenneth Tew

The John C. West Endowed Chair in Cancer Research at the Medical University of South Carolina

Translational Cancer Therapeutics Center of Economic Excellence

- Fellow with the American Association for the Advancement of Science.
- An international leader in cancer drug discovery and development, his research has been pivotal in the design of treatments for hormone refractory prostate cancer.
- Has been instrumental in the clinical testing of drugs that show promise in treating ovarian and lung cancer.
- Working to understand how cancer cells develop resistance to different drugs; discoveries have suggested links between cancer and Alzheimer's Disease.

Dr. Melanie Thomas

Grace E. DeWolff Endowed Chair in Medical Oncology at the Medical University of South Carolina

Gastrointestinal Cancer Diagnostics Center of Economic Excellence

- A leading expert on gastrointestinal cancers including those of the stomach, liver, pancreas, colon, and elsewhere in the GI tract.
- Searches for new targets (proteins that play a role in the disease process and are the intended sites of drug activity) for GI cancer treatment and identifying new ways to screen for GI cancer.
- Devoted to originating and overseeing clinical trials to move the field of oncology forward; has designed and completed more than 20 clinical trials.

Dr. Frank Treiber

Endowed Chair in Technology Applications to Prevent and Manage Disease and Reduce Risk at the Medical University of South Carolina

Healthful Lifestyles Center of Economic Excellence

- Developing technology to help citizens from all segments of society – but especially rural and underserved populations – make healthier lifestyle choices with the goal of reducing health disparities.
- Working to develop products such as information systems for mobile phones, personal digital assistants, i-Pod technologies, and web-based programs. These products could be personalized to patients and designed to help them change their behavior by increasing physical activity, altering their diets, reducing stress, not smoking, and taking their medications on schedule.

Dr. Paul Venhovens

BMW Chair in Automotive Systems Integration at Clemson University

Automotive Systems Integration Center of Economic Excellence

- A leader in the field of automotive systems integration; brings both academic and industry experience to his work at the Clemson University International Center for Automotive Research (CU-ICAR).
- Research focuses on the testing of vehicle systems and their components to ensure efficient and safe operation.
- Work addresses the increasingly complex needs of the world wide automotive industry as a growing number of sophisticated electronic and mechanical systems must be smoothly integrated to create the cars of today and tomorrow.
- Has come to South Carolina from BMW's R&D headquarters in Munich, Germany.

Dr. Richard A. Webb

Endowed Chair in Nanoelectronics at the University of South Carolina

Nanostructures Center of Economic Excellence

- Member of the National Academy of Sciences.
- Researching new quantum devices for use in computer electronics and information technology.
- Scientific accomplishments include fabricating some of the world's smallest electronic circuits, which could open the door to smaller, higher-performing electronic devices.
- Current products based on his discoveries include sensors to diagnose heart problems and monitor internal faults in metal structures. These electronic circuits also have military applications.
- Work has high commercialization potential in a variety of industries and could help grow South Carolina's presence in the advanced electronics field.

Dr. Xuejen Wen

Hansjörg Wyss Endowed Chair Professor in Regenerative Medicine at Clemson University:

Regenerative Medicine Center of Economic Excellence

- Researching ways to regenerate functional and safe human tissues.
- One focus area is biomedical devices. Examples include a "nerve bridging" device that would use material scaffolds and grafted cells to encourage nerve cells damaged by injury to regenerate, and a "living" cochlear implant to help restore hearing loss. Other focus areas include tissue engineering and biomaterial development.
- Has received numerous research awards from the US Defense Department, National Institutes of Health, and the National Science Foundation.

Dr. Patrick Woster

Endowed Chair in Medicinal Chemistry at the Medical University of South Carolina

Cancer Drug Discovery Center of Economic Excellence

- A leading cancer researcher, his work has the potential to advance the biosciences industry in South Carolina.
- Developing drugs that turn specific genes on or off in tumor cells, a process known as epigenetic modulation, that can make anti-tumor medications more effective. Holds eight patents based on compounds he has synthesized.
- Working to discover new treatments for diseases such as malaria and other parasitic illnesses.
- Striving to increase the number of early- and late-stage clinical trials in South Carolina.

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South Carolina's Research Unversities

MUSC
MEDICAL UNIVERSITY of SOUTH CAROLINA

UNIVERSITY OF SOUTH CAROLINA

CLEMSON UNIVERSITY

SmartState Program Mission Statement

The SmartState Program serves the public interest by creating incentives for the state's research universities, in cooperation with other institutions of higher education in the state, to raise capital from non-state sources to fund endowments for specialized research professorships.

These professorships in turn serve as the nucleus for unique, university-based research centers which cultivate critical, public-private industrial partnerships, expand the state's knowledge base, create well-paying jobs, and enhance economic opportunities and improve the quality of life for the people of South Carolina.

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